

with the typical Upper Permian species\*. It differs from all known forms in the ornamentation of its operculum, and evidently represents a new species which may be named *Cœlacanthus madagascariensis*.

EXPLANATION OF PLATE I. FIGS. 1-5.

Ganoid Fishes from a Permo-Carboniferous Formation at Andogozo, Mahavavy River, N.W. Madagascar.

- Fig. 1.* *Ecrinesomus dixonii*, gen. et sp. n.; type-specimen in right side view. The scales below the vertebral axis in the abdominal region shown as impression of inner face, the other scales as impression of outer face. (B.M. no. P. 10756.)
- Fig. 2.* Ditto; head and anterior abdominal region. (B.M. no. P. 10758.)
- Fig. 3.* Ditto; fragment showing pectoral fin, with (3*a*) flank-scale and (3*b*) portion of anal fin-rays enlarged three times. (B.M. no. P. 10759.)
- Fig. 4.* Ditto; portion of dorsal fin with some of the endoskeletal supports. (B.M. no. P. 10760.)
- Fig. 5.* *Cœlacanthus madagascariensis*, sp. n.; type-specimen, with (5*a*) portion of impression of operculum and (5*b*) scales enlarged three times. (B.M. no. P. 10768.)

*a.*, anal fin; *ao.*, axonosts of dorsal fin; *b.*, basals of pectoral fin; *bo.*, base-osts of dorsal fin; *c.*, base of caudal fin; *cl.*, lower end of clavicle; *d.*, dorsal fin; *ll.*, scale of lateral line; *n.*, neural spines; *op.*, operculum; *orb.*, orbit; *pct.*, pectoral fin; *plt.*, post-temporal; *sop.*, sub-operculum; *x.*, internal bone at hinder border of abdominal cavity. Unless otherwise stated, the figures are of the natural size.

II.—*Notes on some Upper Palæozoic Shells from Madagascar.* By R. BULLEN NEWTON, F.G.S., of the British Museum.

[Plate I. figs. 6-11.]

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ACCOMPANYING the fish-remains discovered by Mr. George G. Dixon at Andogozo, near the west coast of the northern end of Madagascar, which are recognized by Dr. A. S. Woodward as of late Palæozoic age, are certain small mollusca of rather imperfect preservation, although sufficiently interesting to claim some remarks on this occasion.

The specimens consist of (1) a discoidal gastropod, embedded as a limonite cast on the inner surface of a narrow

\* A. S. Woodward, 'Catalogue of Fossil Fishes in the British Museum,' pt. ii. (1891), pp. 399-408.

elongate nodule, associated with one of the fish-fragments; and (2) a series of minute pelecypod valves crowded together in a similar but smaller nodule and of more oval shape, which apparently belong to one species. The gastropod seems to be easily determined as a form of *Planorbis*, whilst the bivalves may be referred to the genus *Naiadites* of J. W. Dawson, originally described from the Upper Carboniferous rocks of Nova Scotia.

So far as can be ascertained, no *Planorbis* has been recorded from rocks older than the Lias, Charles Moore having described a species from the lower part of that formation together with other freshwater mollusca which had been found in the Mendip country of England (Quart. Journ. Geol. Soc. 1867, vol. xxiii. pl. xv. fig. 10, p. 548). Strange to say, the affinities of the Malagasy shell appear to resemble the well-known modern form of *Planorbis carinatus* of Müller, on account of its possessing, among its other characters, a peripheral carination, the presence of which would place it in Stein's genus *Tropidiscus* (established on the Müller shell just mentioned), but for present purposes it is, perhaps, advisable to recognize the specimen under the more popular name of *Planorbis*.

The occurrence of *Naiadites* is also of considerable interest, since it assists in confirming the view that these fossiliferous nodules are of Upper Palæozoic age. It is only quite recently that Palæozoic fossils have been discovered in Madagascar by Captain Colcanap, of the French army. Previously, Professor Marcellin Boule had remarked on a series of sandstones, conglomerates, and schists forming the base of the sedimentary series in that country, which reposed on the crystalline rocks and extended with them from north to south of the island. Apparently unfossiliferous, with the exception of silicified trunks of trees which had never been satisfactorily determined, these deposits were regarded as of Triassic age, being compared with the Karoo formation of South Africa and the Gondwana Series of India ("La Géologie et la Paléontologie de Madagascar": Congrès Géologique International, viii. session, France, 1900 [Paris 1901], p. 5, pl. xii. = Geological Map of Madagascar). When the new material from Capt. Colcanap was examined, Professor Boule was able to announce the discovery of a Permian fauna and flora as well as coal deposits in the Mahafaly district of the south-western part of the country—forming part of the supposed Triassic rocks previously mentioned,—including remains of reptiles, fishes, and *Glossopteris*; the latter determined by Professor Zeiller as

*Glossopteris indica* (Compt. Rendus, 1908, vol. cxlvi. pp. 502-504 & vol. cxlvii. pp. 818, 819), a species of fern known from the late Palæozoic deposits of South Africa, India, Australia, Tasmania, Falkland Islands, and South America (Argentina).

The discovery of such an assemblage of fossils was a great advance on our previous knowledge of Madagascan geology, because it proved, on the one hand, relationships with the Karoo beds of Southern Africa, and, on the other, with the Gondwana deposits of India and other geologically related regions. With regard to the molluscan remains brought home by Mr. Dixon from this northern district of the island, it may be mentioned that neither a Planorbiform shell of so ancient an horizon nor *Naiadites* have yet been recorded from Africa or India. The Karoo formation of Africa, and especially the Beaufort-beds division, has yielded freshwater pelecypods belonging to the genera *Palæomutela* and *Palæunodonta* of Professor Amalitzky, which, that author some years since pointed out, resembled almost species for species a fauna characteristic of the upper part of the Russian Permian formation, and so he considered those distant deposits as homotaxially equivalent (Quart. Journ. Geol. Soc. 1895, vol. li. pp. 337-351, pls. xii., xiii.).

In the latest work on South African geology we find that Dr. A. W. Rogers acknowledges Amalitzky's work and brackets the Beaufort series with the Permian of Europe (A. W. Rogers and A. L. Du Toit, 'An Introduction to the Geology of Cape Colony,' 1909, 2nd edition, pp. 231, 243). No similar bivalve mollusca are known from the Gondwana beds of India, and it is chiefly from the facies of the *Glossopteris* flora characterizing those deposits that a homotaxial relationship with the African Karoo has been demonstrated.

It would seem, therefore, that in future correlation schemes connected with the geological history of Madagascar we have to recognize not only Captain Colcanap's and Professor Boule's important discoveries as to the presence of Upper Palæozoic deposits in that island, but also to include the valuable fish and molluscan remains collected by Mr. Dixon, which add a new interest to the palæontological features of those beds.

#### DESCRIPTION OF THE MOLLUSCA.

##### GASTROPODA.

*Planorbis dixonii*, sp. n. (Pl. I. figs. 6, 7.)

*Shell* small, discoidal, plano-convex, and furnished with a smooth peripheral carination; outer whorl wide and equal

near the aperture to the width of the remainder of the spiral system.

*Dimensions* : 5·5 by 4 mm.

This fossil bears a remarkable resemblance to Müller's modern species *Planorbis carinatus*, which forms the type of Stein's genus *Tropidiscus*, on account of the possession of a peripheral carination. From its condition as a limonite cast sculpture-markings are scarcely decipherable. It occurs embedded on the inner surface of one of the nodules accompanied by a fish-fragment, which, according to Dr. A. S. Woodward, is not capable of determination. A basal disc view of the specimen is exhibited on one half of the nodule, whilst its counterpart in the other half shows a discoidal interior of the outer volution as well as obscure traces of the internal volutions. The specific name is applied in honour of the discoverer.

#### PELECYPODA.

*Naiadites madagascariensis*, sp. n. (Pl. I. figs. 8-11.)

*Shell* small, subquadrate, oblique, submedianly elevated, sloping laterally; hinge-line straight; umbones anterior; pallial line entire; sculpture consisting of rather distant concentric lines of growth and finer striations on the lateral regions.

*Dimensions* : 3·5 by 3 mm.

The valves of this shell are grouped together on the inner surface of one of the small nodules and appear mostly as internal cavities, although a wax impression reproduces satisfactorily their original external condition. From this it is apparent that the shell with such characters as are referred to may be identified with Dawson's genus *Naiadites*, a freshwater form originally described from the Coal-measure deposits of Nova Scotia, and founded on the type of *Naiadites carbonarius* of the same author ('Acadian Geology,' supplement to 1st edition, 1860, p. 43, & 2nd edition, 1868, p. 204). Some of the interiors show very clearly the simple and non-sinuate character of the pallial impression; but the details of the hinge are quite obscure, from the result probably of immature growth, so that no horizontal striations are observable, such as Dr. Wheelton Hind regards as characteristic of this genus ('Monograph Palæontographical Society,' 1895, p. 126).

It is possible that the affinities of this mollusc may be looked for between Dawson's *N. carbonarius* and *N. modiolaris* of J. de C. Sowerby, both of which occur in the coal-formation of Britain and the Continent.

Madagascar is quite a new area for the genus *Naiadites*, and it has not yet been recorded from the Karoo formation of South Africa, which contains other forms of fresh-water bivalves, such as *Palæomutela* and *Palæanodonta*. Some years since Professor Amalitzky described several forms of this genus from the Russian Permian, but on a closer study he found that they were *Anodonta*-like shells and differed materially from the original type of *Naiadites* of 1860; he therefore founded the new genus *Palæanodonta* for the reception of those species (Quart. Journ. Geol. Soc. 1895, vol. li. pp. 346, 347). It is now generally recognized that Salter's *Anthracoptera* of a later date is the equivalent of Dawson's *Naiadites*.

EXPLANATION OF PLATE I. FIGS. 6-11.

Upper Palæozoic (Permo-Carboniferous) Mollusca from Andogozo, on the Mahavavy River, North-western Madagascar; presented to the British Museum by the collector, Mr. George G. Dixon.

*Figs. 6, 7. Planorbis dixonii*, sp. n.  $\times 4$ . Fig. 6=basal disc view; fig. 7 =counterpart of same, with obscure evidence of inner whorls.

*Fig. 8. Naiadites madagascariensis*, sp. n. Internal face of nodule showing the gregarious nature of the valves, slightly enlarged.

*Fig. 9.* External aspect of a right valve. { Drawn from wax

*Fig. 10.* " " " left valve. { impression.  $\times 4$ .

*Fig. 11.* Interior of a left valve showing pallial line.  $\times 4$ .

III.—*Descriptions of Oriental Capsidæ.*

By W. L. DISTANT.

[Concluded from vol. iv. p. 523.]

AZIZUS, gen. nov.

Head deflected in front of eyes, longer than broad, eyes large and globose, prominently projecting beyond the anterior margins of the pronotum; antennæ somewhat long and robust, first joint stoutest, a little longer than head, slightly curved, second joint nearly three times as long as first, third about two-thirds the length of second and nearly twice as long as fourth; rostrum passing the posterior coxæ; pronotum nearly twice as broad at base as long and nearly three times as broad as anterior margin, the basal margin concave, transversely constricted near anterior margin, the anterior area with a small tubercle on each lateral margin, the lateral